AMENDMENTS

In the Claims:

Please amend the claims as indicated hereafter.

1. (Previously Presented) A multi-function unit of a graphics system, comprising:

a hierarchical tiler configured to occlusion test primitives, the primitives comprising a maximum Z value and a minimum Z value, the maximum and minimum Z values associated with respective X-Y coordinate values, the hierarchical tiler further configured to create a Z pyramid data structure as polygons defined by a plurality of primitives are processed by the multi-function unit;

a parameter interpolator coupled to the hierarchical tiler configured to receive the X-Y coordinate values from the hierarchical tiler and generate a Z value at the pixel level for each received X-Y coordinate value;

a pixel-level comparator coupled to the parameter interpolator configured to determine at a pixel level which values need to be written by a frame buffer controller; and

a memory unit coupled to the hierarchical tiler and the pixel-level comparator, the memory unit configured to store a change in the Z pyramid data structure responsive to an occlusion test result for a visible primitive before the pixel-level comparator determines whether pixel level values for the visible primitive need to be written by the frame buffer controller.

2. – 3. (Canceled)

4. (Previously Presented) The multi-function unit of claim 1, wherein the Z pyramid data structure is periodically updated in accordance with pixel level values from a Z buffer responsive to the frame buffer controller.

5. (Previously Presented) The multi-function unit of claim 1, wherein the pixel level comparison is performed responsive to pixel level values from a Z buffer responsive to the frame buffer controller.

6. (Previously Presented) The multi-function unit of claim 1, further comprising:

an object function unit coupled to the pixel level comparator and the Z buffer configured to perform at least one function selected from clipping, patterning, transferring, and filling.

7. (Previously Presented) The multi-function unit of claim 1, wherein the hierarchical tiler maintains coverage masks to update the Z pyramid data structure.

8. (Previously Presented) The multi-function unit of claim 7, wherein the Z pyramid data structure comprises a plurality of levels, each level comprising a plurality of regions, each region comprising a plurality of subregions, each subregion comprising a Z value.

9. (Previously Presented) The multi-function unit of claim 8, wherein the hierarchical tiler compares the minimum Z value of each primitive with the Z value of a region to determine if the primitive is occluded.

10. (Previously Presented) The multi-function unit of claim 9, wherein in response to a determination that the visible primitive is not fully occluded, the hierarchical tiler determines whether any subregion of the region is fully covered by the primitive.

11–20 (Canceled)

21. (Previously Presented) The multi-function unit of claim 10, wherein when a present subregion is covered, the hierarchical tiler determines whether the Z value of the covered subregion is to be replaced with the maximum Z value of the visible primitive.

22. (Previously Presented) The multi-function unit of claim 1, wherein the hierarchical tiler maintains a coverage mask for each level of the Z pyramid data structure.

23. (Previously Presented) The multi-function unit of claim 22, wherein when the hierarchical tiler determines that the maximum Z value of the visible primitive is less than the Z value for a covered subregion, a bit in the coverage mask associated with the covered subregion is set.

24. (Previously Presented) The multi-function unit of claim 23, wherein in response to a determination that all the coverage mask bits corresponding to the subregions of a particular region have been set in the coverage mask associated with a first level of the Z pyramid structure, a bit is set for the corresponding region in the coverage mask associated with a next level up in the Z pyramid data structure.

25. (Previously Presented) The multi-function unit of claim 24, wherein in response to a determination that all the bits in the coverage mask have been set for a particular region in the coverage mask, the hierarchical tiler replaces the maximum Z value for the particular region with the maximum Z value of all the subregions associated with the particular region.

26. (Previously Presented) The multi-function unit of claim 25, wherein in response to a determination that all the bits in the coverage mask have been set for a particular region in the coverage mask, the hierarchical tiler sets the corresponding bit in the coverage mask for a next level up in the Z pyramid data structure.

27. (Previously Presented) The multi-function unit of claim 1, wherein the hierarchical tiler maintains, for the Z pyramid data structure, coverage masks that are separate from the Z pyramid data structure and that indicate which Z values in the Z pyramid data structure need to be updated.

28. (Previously Presented) The multi-function unit of claim 27, wherein the hierarchical tiler is configured to adjust the coverage mask associated with a particular level of the Z pyramid structure in response to a determination by the hierarchical tiler that the maximum Z value of the visible primitive is less than the Z value for a covered subregion at the particular level of the Z pyramid structure.

29. (Currently Amended) A method for use in a graphics system, comprising:

defining a Z pyramid data structure, the Z pyramid data structure comprising a maximum Z value for a group of pixels defining a region, the region having a plurality of subregions including a first subregion, the Z pyramid data structure having a Z value for the first subregion;

comparing a minimum Z value of a primitive to the Z pyramid data structure;

determining whether the primitive is occluded based on the comparing;

scan converting the primitive to a pixel level if the primitive is determined to be not fully occluded in the determining; [[and]]

updating the Z pyramid based on the primitive prior to the scan converting, the updating comprising changing the Z value for the first subregion to the maximum Z value of the primitive if the first subregion is fully covered by the primitive and if the maximum Z value of the primitive is less than the Z value for the first subregion;

maintaining a coverage mask indicating whether Z values of the Z pyramid data structure for each of the subregions have been updated;

updating the coverage mask in response to the changing; and

updating the maximum Z value for the group of pixels in response to a determination that the coverage mask indicates that each of the Z values for each of the subregions has been updated.

30. (Canceled)

31. (Currently Amended) The method of claim 30, wherein ~~the region has a plurality of subregions, and wherein the method further comprises: maintaining a coverage mask for the Z pyramid data structure,~~ the coverage mask ~~having~~ has [[a]] bits respectively corresponding with each of the ~~respective subregions; and~~ subregions and wherein the updating the coverage mask comprises setting the bit of the coverage mask corresponding to the first subregion ~~if the Z value for the first subregion is changed to the maximum Z value of the primitive~~.

32-33. (Canceled)